

Application Serial No.: 09/926,146
Amendment dated July 26, 2004
Reply to Office Action dated March 24, 2004

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-7, 9-13, and 16-19 are presently active in this case, Claims 1, 4, 18, and 19 having been amended and Claims 14 and 15 having been canceled without prejudice or disclaimer by way of the present Amendment.

In the outstanding Official Action, Claims 1-7 and 9-19 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The Applicants respectfully traverse this rejection. The specification states on page 11, lines 22-25, that "it is preferable to omit slantingly disposed blades or holes which may cause blind spots in cleaning operation of the stirred tank, and to have the stirring impeller vertically arranged with no holes or any other openings therein." (See also page 11, line 26, through page 12, line 2.) Thus, the present application does provide written description support for the configurations recited in the claims, including the negative limitations recited therein. Thus, the Applicants respectfully request the withdrawal of the rejection under 35 U.S.C. 112, first paragraph.

Claims 1-3, 9, 14, 16, and 18 were rejected under 35 U.S.C. 102(e) as being anticipated by Akamine et al. (U.S. Patent No. 6,244,741). Claims 4-7, 10-15, 17, and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Grylls et al. (U.S. Patent No. 4,188,407) in view of Akamine et al. For the reasons discussed below, the Applicants request the withdrawal of the art rejections.

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Claims 1 and 18 recite a stirred tank comprising a tank body with a bottom portion having an inverted cone shape, and a stirring impeller positioned within the tank body of the stirred tank and so constructed that a maximum diameter of a rotation body defined by the rotation of the stirring impeller is 60-90% of the inner diameter of the stirred tank, and the height of the rotation body is 70% or more of a depth of the part of yeast slurry stored in the stirred tank. Claim 1 recites a stirring impeller made up of vertically oriented surfaces with no slant surface. Claim 18 recites a stirring impeller including vertically flat surfaced paddle blades with no slanting surfaces. The Applicants submit that the Akamine et al. reference fails to disclose all of the limitations recited in Claims 1 and 18 as will be discussed below.

Claims 4 and 19 recites a method of manufacturing beer comprising: providing a stirring impeller positioned within a tank body of the stirred tank, where the tank body has a bottom portion of an inverted cone shape, and so constructed that a maximum diameter of a rotation body defined by the rotation of the stirring impeller is 60-90% of the inner diameter of the stirred tank, and the height of the rotation body is 70% or more of a depth of the part of yeast slurry stored in the stirred tank; and stirring the yeast slurry by rotating the stirring impeller at a rotational speed of 1-30 rpm. Claim 4 recites that the stirring impeller is made up of vertically oriented surfaces with no slanting surface. Claim 19 recites that the stirring impeller includes vertically flat surfaced paddle blades with no slanting surface. The Applicants submit that the Grylls et al. reference and the Akamine et al. reference, either taken alone or in combination fail to disclose all of the limitations recited in Claims 4 and 19 as will be discussed below.

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The Akamine et al. reference describes a stirring device that includes a vertical cylindrical stirring vessel, a rotary shaft vertically extending within the stirring vessel for rotation, and a stirring vessel constituted of two or more basically rectangular vane plates vertically supported on the rotary shaft in symmetrical relation with each other with respect to the rotary shaft. The Official Action indicates that the Akamine et al. reference teaches a stirring device having the claimed dimensions citing to column 4, lines 13-38, of the reference. However, the Applicants respectfully disagree with this assertion. The portion of the cited reference only refers to that overall height (H_3) of the stirring vane (3), which is preferred to be about 2/3 of the effective height of the stirring vessel. This dimension is lower than the dimension of the present invention defined by the recitation in Claims 1, 4, 18, and 19 that the height of the rotation body is 70% or more of a depth of the part of yeast slurry stored in the stirred tank. Accordingly, the Akamine et al. reference does not anticipate the claims of the present application.

Furthermore, all of the independent claims (Claims 1, 4, 18, and 19) are limited by reciting a tank body with a bottom portion having an inverted cone shape. To the contrary, the Akamine et al. reference describes a stirring vessel with a bottom having a flat shape. Thus, the claims of the present application are further distinguishable over the Akamine et al. reference due to the shape of a tank body. Accordingly, the rejection under 35 U.S.C. 102(e) should be withdrawn.

The Applicants respectfully submit that the obviousness rejection should be withdrawn. The Grylls et al. reference does not supplement the deficiencies discussed above

in the teachings of the Akamine et al. reference.

As described above, according to the present invention recited in the independent claims, the height of the rotation body is 70% or more of a depth of the part of yeast slurry stored in the stirred tank. On the other hand, the Akamine et al. reference refers only to that overall height (H_3) of the stirring vane (3) is preferred to be about 2/3 of the effective height of the stirring vessel. This difference is significant, not only resulting in a dimensional difference, since this dimensional difference is necessitated due to its special field of application, namely a stirred tank for storing a part of yeast slurry discharged from fermentation tanks where beer is fermented. That is, as described in the description, page 4, lines 3-6, with the height of the rotation body being 70% or more of a depth of the part of yeast slurry stored in the stirred tank, a desirable stirring effect can be produced even through a relatively low rotational speed, and as a result, there is produced an effect that the stirring is unlikely to damage and destroy yeast, and hence deteriorate its biological activity.

Particularly, beer yeast slurry is Bingham fluid which shows a unique behavior, as mentioned in Example 8 (Fig. 15) of the present application. In Example 8, it is mentioned that the yeast slurry is not a common fluid which can relatively easily be mixed, but a unique fluid which requires a special attention to be entirely fluidized and hence uniformly mixed. In order to produce “an effect that the stirring is unlikely to damage and destroy yeast, and hence deteriorate its biological activity”, the relationship between the height of the rotation body and the depth of the part of yeast slurry stored in the stirred tank is set to “70% or more.” To the contrary, the relationship in the Akamine et al. reference is defined by “overall

height H_3 of the stirring vane 3 is preferred to be about $2/3$ of the effective height H_1 of the stirring vessel” is to produce an effect, “owing to the presence of the V-shaped recess formed in the upper portion of the stirring vane, upward flow from the lower portion of the stirring vane can be promoted to grow vertical circulating flow in the axial direction to significantly improve stirring efficiency.” (Col. 8, lines 7-15). Accordingly, it is presumable that an excessive overall height of the stirring vane relative to the effective height of the stirring vessel may cause no proper vertical circulating flow, and therefore, the overall height (H_3) of the stirring vane (3) is set to about $2/3$ of the effective height of the stirring vessel in order to produce the above effect.

Thus, the impeller of the present invention is greatly different in each required function from the vane of the Akamine et al. reference, and this functional difference results from the difference in application of the stirring vessel between the present invention and the Akamine et al. reference.

If beer yeast slurry is stirred in a stirring vessel with the overall height (H_3) of the stirring vane (3) being about $2/3$ of the effective height of the stirring vessel to such an extent to achieve uniform mixture, it is likely to damage and destroy yeast, and hence deteriorate its biological activity. Also, if an attempt to avoid damage and destroy of yeast and deterioration of its biological activity is made with such a vessel, uniform mixture may not be achieved. Consequently, where the vane of the Akamine et al. reference is applied to a stirring vessel for storing yeast slurry for manufacturing beer, there is caused a significant difference in the resulting effect.

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Again, the above mentioned further limitation of the shape of the bottom portion of the tank body to an inverted cone shape makes the present invention distinguishable over the Akamine et al. reference, which describes a vessel with a flat bottom. This inverted cone shape results from a special field of application, to which the stirred tank of the present invention is used, namely as a stirred tank for storing beer yeast slurry. That is, a stirred tank for storing yeast slurry like the stirred tank of the present invention is to store a part of yeast slurry discharged from a fermentation tank and then return the same to the fermentation tank for reuse. At the time of returning the slurry to the fermentation tank, the yeast slurry is discharged from the stirred tank. This discharge must be made so as not to leave yeast slurry in the stirred tank for ease of tank washing or for some other reasons. The discharge with leaving no slurry can be facilitated by forming the bottom of the tank body to the inverted cone shape. In light of this, the tank with a flat bottom as described in the Akamine et al. reference is not suitable for storing beer yeast.

The Grylls et al. reference appears to be cited for the teaching of a rotor blade that is rotated preferably at 10 to 20 rpm. However, the Applicants respectfully submit that such a combination for supporting non-obviousness rejection in combination with the Akamine et al. reference is not acceptable for the reason below.

The apparatus of the Grylls et al. reference is configured to stir not yeast slurry such as beer as in the present invention, but rather dry yeast particles. The apparatus of the Grylls et al. reference is not equipped with a stirring impeller as in the present invention, but rather stirring rod (6). The apparatus of the type described in the Grylls et al. reference, which stirs

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contents in the tank with such a rod, is highly unlikely to stir slurry such as beer yeast at the same efficiency as the present invention. Therefore, even if the Grylls et al. reference describes such slow rotation of 10-20 rpm, the stirring condition of the Grylls et al. reference is greatly different from that of the present invention because the stirring at such slow rotation is made by not an impeller but a rod, and a content to be stirred is not yeast slurry but dry yeast particles. Hence one of ordinary skill in the art would not have looked to the Grylls et al. reference to solve the problems that are solved by the present invention.

Furthermore, the particular shape of the bottom of the tank body as recited in Claims 1, 4, 18, and 19 of the present application is not disclosed in the Grylls et al. reference.

Accordingly, the Applicants submit that a *prima facie* case of obviousness cannot be established in the present case base upon the combination of the Grylls et al. reference and the Akamine et al. reference because (1) the references, either taken alone or in combination, do not teach or suggest all of the claim limitations, and (2) there is no suggestion or motivation to combine the references. (See MPEP 2143.) Thus, the Applicants respectfully request the withdrawal of the obviousness rejection of Claims 4 and 19.

Claims 2, 3, 9, and 16 are considered allowable for the reasons advanced for Claim 1 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed, taught, nor suggested by the applied references when those features are considered within the context of Claim 1.

Claims 5, 6, 10-13, and 17 are considered allowable for the reasons advanced for Claim 4 from which they depend. These claims are further considered allowable as they

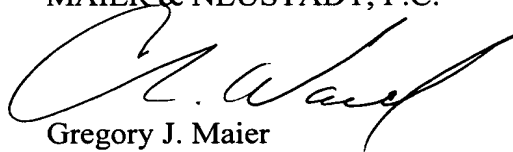
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recite other features of the invention that are neither disclosed, taught, nor suggested by the applied references when those features are considered within the context of Claim 4.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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